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SOLAR/2011-79/03

Monthly Performance Report

TERRELL D. MOSELEY

MARCH 1979

U.S. Department of Energy

National Solar Heating and Cooling Demonstration Program

National Solar Data Program

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MONTHLY PERFORMANCE REPORT
TERRELL D. MOSELEY
MARCH 1979

I. SYSTEM DESCRIPTION

The Terrell D. Moseley Co. site is a 1,780-square foot, single story, commercial office building with attached warehouse in Lynchburg, Virginia. The solar energy system is designed to provide approximately 70 percent of the space heating and hot water energy requirements of the office building. Because the hot water consumption is very low, only the space heating system is monitored for performance evaluation. The site has a collector array of 16 flat-plate collectors built by T. D. Moseley. The collector array has a gross area of 400 square feet, and faces south at a tilt angle of 50 degrees from the horizontal. Water is the heat transfer medium throughout the solar energy system. Collected solar energy is delivered to the 2,000-gallon storage tank, which is in an unheated attached warehouse building. The insulation on the tank is four inches of fiberglass.

When solar energy is insufficient to maintain 105°F storage temperatures, a gas-fired boiler (auxiliary heater) provides additional energy to storage. Space heating is provided by circulating storage water through a heat exchanger located in the air distribution system of the building. Since the collector fluid automatically drains into storage after each solar energy collection operation, additional collector freeze protection measures are not required.

The system, shown schematically in Figure 1, has three modes of solar operation, which are described below.

Mode 1 - Collector-to-Storage: This mode is entered when the collector absorber plate temperature exceeds the middle storage temperature by 20°F. The transfer fluid is circulated from storage through the collectors and back to storage until this temperature differential drops to less than 3°F.

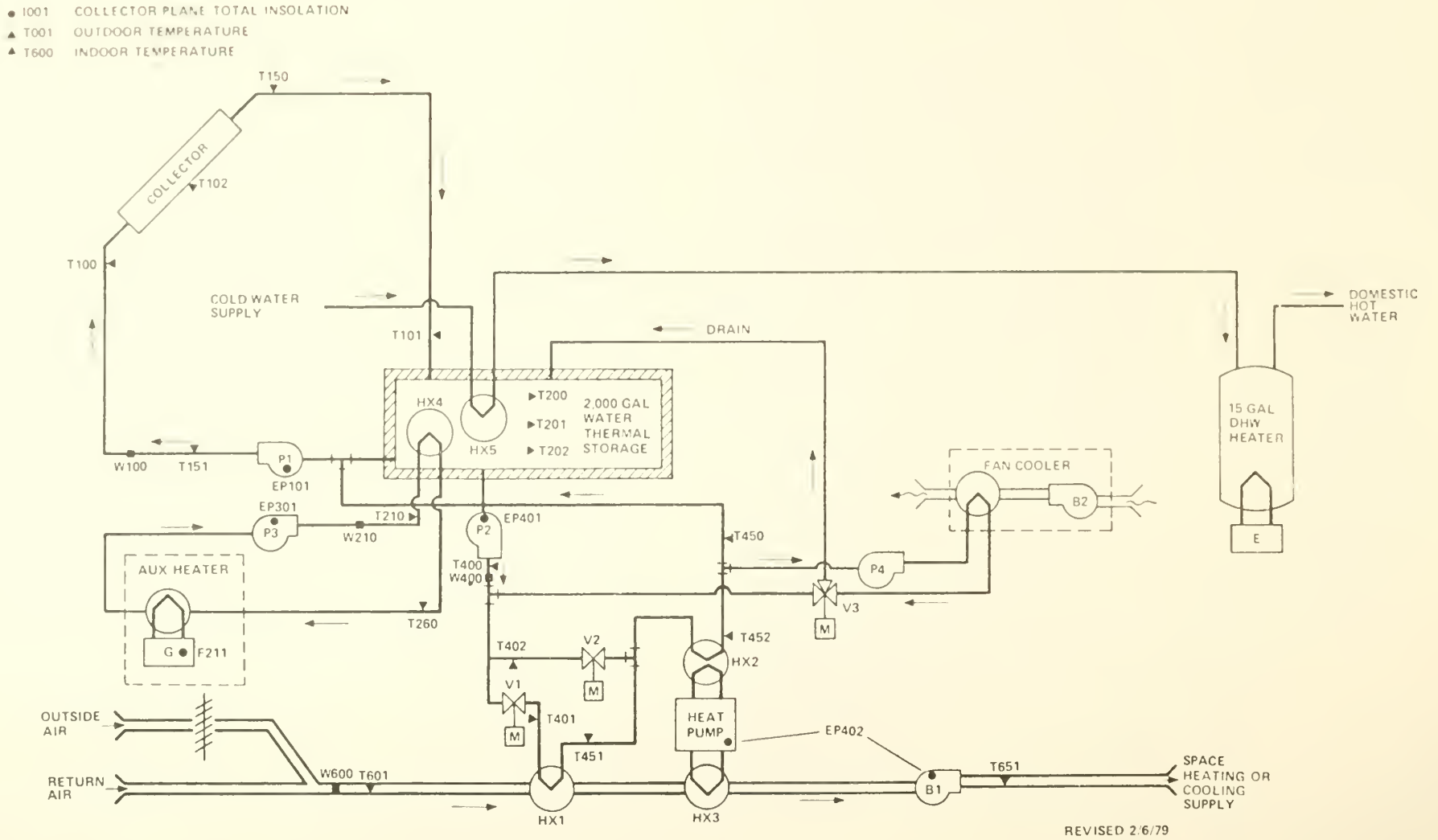

Figure 1. T. D. MOSELEY SOLAR ENERGY SYSTEM SCHEMATIC

Mode 2 - Storage-to-Space Heating: This mode is entered when there is a demand for space heating and the sensed temperature of the storage water is greater than 85°F. Water is circulated between storage and liquid-to-air heat exchanger HX1 in the air-handling unit distribution duct until the space heating demand is satisfied, or the sensed storage temperature drops below 85°F.

Mode 3 - Storage-to-Heat Pump: This mode of operation will provide space heating when Mode 2 operation is not available. This mode is entered when there is a demand for space heating and the temperature of the storage water is below 85°F. Energy input to the heat pump is supplied by opening the normally closed valve V2, closing the normally open valve V1, and circulating storage water through heat pump evaporator HX2. This mode is terminated when either the sensed storage temperature rises above 90°F, or when no space heating demand exists.

II. PERFORMANCE EVALUATION

The system performance evaluations discussed in this section are based primarily on the analysis of the data presented in the attached computer-generated monthly report. This attached report consists of daily site thermal and energy values for each subsystem, plus environmental data. The performance factors discussed in this report are based upon the definitions contained in NBSIR-76-1137, Thermal Data Requirements and Performance Evaluation Procedures for the National Solar Heating and Cooling Demonstration Program.

A. Introduction

The solar energy system at the T. D. Moseley site was operational throughout March, and satisfied 49 percent of the space heating energy requirements. The solar energy system saved 4.54 million Btu of fossil fuel energy, at the expense of 0.71 million Btu of electrical operating energy.

B. Weather

Based on Climatological data from the National Oceanic and Atmospheric Administration, the long-term average outside ambient temperature for March in Lynchburg, Virginia, is 46°F. The measured average outside ambient temperature was 49°F. The measured insolation in the plane of the collector array averaged 1,447 Btu/ft^2-day, which is four percent below normal for the area. The long-term average is 1,508 Btu/ft^2-day, based on insolation data from the Climatic Atlas of the United States.

C. System Thermal Performance

Collector - Of the 17.94 million Btu of solar energy incident on the collector array during March, 15.48 million Btu were incident on the array when the collector pump P1 (Figure 1) was operating. The system collected 4.51 million Btu, or 25 percent of the total insolation incident on the collector array. In addition to collecting energy, the array rejected 0.13 million Btu from storage as a result of collector pump operation during periods of insufficient insolation levels. This amount of rejected energy is included in the performance calculations for solar-energy-collected, energy-to-storage, and collector array efficiency. The operation of pump P1 required 0.40 million Btu.

Storage - The solar energy system delivered 4.17 million Btu to storage during March. There was an apparent transport energy loss of 0.34 million Btu between the collectors and storage. The auxiliary heater supplied 3.74 million Btu of auxiliary thermal energy to storage. A total of 5.57 million Btu was extracted from storage during the month and sent to the conditioned space. The average storage temperature was 117°F. The energy loss from storage was 1.91 million Btu, which was computed by subtracting the sum of the change in storage energy (+0.42 million Btu) and the energy removed from storage, from the total thermal energy delivered to storage (7.90 million Btu). The amount of energy supplied to the domestic hot water (DHW) subsystem is included in this energy loss calculation because the DHW subsystem is not instrumented for performance evaluation.

Space Heating Load - The space heating load for March was calculated to be 5.57 million Btu. Solar energy satisfied 49 percent of the heating load. The subsystem operated in Mode 2 throughout the month when space heating was required. Auxiliary thermal energy was supplied to the space heating subsystem via the storage tank through the operation of the auxiliary heater. The electrical energy needed to operate pumps P2 and P3, and the blower B1 amounted to 0.64 million Btu.

D. Observations

For the month of March, 20 percent more thermal energy was delivered to the space heating load, as measured at heat exchanger HX1, than was measured leaving storage. This result was apparently caused by diversion of a portion of the total heat exchanger HX1 flow, as measured by sensor W400, through valve V2. The reduced flow through heat exchanger HX1 resulted in an increased temperature difference (T401-T451) which caused the calculation of the space heating load parameter at heat exchanger HX1 to be invalid. Therefore, the space heating load calculation for March was made from temperature measurements made at the output of storage. Because of this alternate calculation, any energy losses from piping between storage and heat exchanger HX1 are included in the building space heating load calculation, but do not actually enter the conditioned space. The significance of these losses cannot be determined until the simultaneous flow through valves V1 and V2 ceases.

During the operation of circulating pump P3, the flow, as measured by sensor W210, was determined to be 14 percent high due to a measurement bias. A correction factor was introduced into the performance equation when computing the auxiliary thermal energy to storage parameter for this report period.

E. Energy Savings

The T. D. Moseley solar energy system provided savings of 4.54 million Btu of natural gas during March, at the expense of 0.71 million Btu of

electricity for operating the solar portion of the system. The savings of 4.54 million Btu are the natural gas equivalent of the 2.72 million Btu of solar energy removed from storage and supplied to the conditioned space. The burning efficiency of the natural gas boiler used in the fossil fuel savings calculations was assumed to be 0.60.

III. ACTION STATUS

Investigation of the simultaneous flow condition through valves V1 and V2 was continued on March 27 with the site contractor. It is believed that control logic, remaining from a previous control scheme, caused valve V2 to open whenever second stage thermostat space heating requirements existed.

A site visit will be scheduled in April to correct the erroneous flow indication from flow sensor W210.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
SITE SUMMARY

SITE: MOSELEY
REPORT PERIOD: MARCH, 1979

SOLAR/2011-79/03

SITE/SYSTEM DESCRIPTION:
T. O. MOSELEY SOLAR ENERGY SYSTEM IS DESIGNED TO PROVIDE HEATING FOR A 1,780 SQUARE FOOT OFFICE BUILDING. ENERGY COLLECTION AND STORAGE IS PROVIDED BY A 400 SQUARE FOOT FLAT-PLATE COLLECTOR ARRAY AND A 2,000 GALLON STORAGE TANK. WATER IS USED AS THE HEAT COLLECTION, TRANSFER, AND STORAGE FLUID. SPACE HEATING IS PROVIDED BY A WATER/AIR HEAT EXCHANGER LOCATED IN THE AIR HANDLER UNIT DUCTING. A NATURAL GAS-FIRED BOILER PROVIDES THERMAL ENERGY TO STORAGE TO SUPPLEMENT SOLAR ENERGY.

GENERAL SITE DATA:

INCIDENT SOLAR ENERGY	17.944	MILLION BTU
	44860	BTU/SQ.FT.
COLLECTED SOLAR ENERGY	4.513	MILLION BTU
	11283	BTU/SQ.FT.
AVERAGE AMBIENT TEMPERATURE	49	DEGREES F
AVERAGE BUILDING TEMPERATURE	70	DEGREES F
ECSS SOLAR CONVERSION EFFICIENCY	0.15	
ECSS OPERATING ENERGY	0.404	MILLION BTU
TOTAL SYSTEM OPERATING ENERGY	1.046	MILLION BTU
TOTAL ENERGY CONSUMED	12.199	MILLION BTU

SUBSYSTEM SUMMARY:

	HOT WATER	HEATING	COOLING	SYSTEM TOTAL
LOAD	N.A.	5.568	N.A.	5.568 MILLION BTU
SOLAR FRACTION	N.A.	49	N.A.	49 PERCENT
SOLAR ENERGY USED	N.A.	2.724	N.A.	2.724 MILLION BTU
OPERATING ENERGY	N.A.	0.642	N.A.	1.046 MILLION BTU
AUX. THERMAL ENERGY	N.A.	2.844	N.A.	2.844 MILLION BTU
AUX. ELECTRIC FUEL	N.A.	0.000	N.A.	0.000 MILLION BTU
AUX. FOSSIL FUEL	N.A.	6.661	N.A.	6.661 MILLION BTU
ELECTRICAL SAVINGS	N.A.	-0.308	N.A.	-0.712 MILLION BTU
FOSSIL SAVINGS	N.A.	4.540	N.A.	4.540 MILLION BTU

SYSTEM PERFORMANCE FACTOR: 0.549

* DENOTES UNAVAILABLE DATA
@ DENOTES NULL DATA
N.A. DENOTES NOT APPLICABLE DATA

REFERENCE: USER'S GUIDE TO THE MONTHLY PERFORMANCE REPORT OF THE NATIONAL SOLAR DATA PROGRAM, FEBRUARY 28, 1978, SOLAR/0004-78/18

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
SITE SUMMARY

SITE: MCSELEY
REPORT PERIOD: MARCH,1979

SOLAR/2011-79/03

SITE/SYSTEM DESCRIPTION:
T. D. MCSELEY SOLAR ENERGY SYSTEM IS DESIGNED TO PROVIDE HEATING FOR A 1,780 SQUARE FOOT OFFICE BUILDING. ENERGY COLLECTION AND STORAGE IS PROVIDED BY A 400 SQUARE FOOT FLAT-PLATE COLLECTOR ARRAY AND A 2,000 GALLON STORAGE TANK. WATER IS USED AS THE HEAT COLLECTION, TRANSFER, AND STORAGE FLUID. SPACE HEATING IS PROVIDED BY A WATER/AIR HEAT EXCHANGER LOCATED IN THE AIR HANDLER UNIT DUCTING. A NATURAL GAS-FIRED BOILER PROVIDES THERMAL ENERGY TO STORAGE TO SUPPLEMENT SOLAR ENERGY.

GENERAL SITE DATA:

INCIDENT SOLAR ENERGY	18.931	GIGA JOULES
	509430	KJ/SQ.M.
COLLECTED SOLAR ENERGY	4.761	GIGA JOULES
	128131	KJ/SQ.M.
AVERAGE AMBIENT TEMPERATURE	9	DEGREES C
AVERAGE BUILDING TEMPERATURE	21	DEGREES C
ECSS SOLAR CONVERSION EFFICIENCY	0.15	
ECSS OPERATING ENERGY	0.426	GIGA JOULES
TOTAL SYSTEM OPERATING ENERGY	1.104	GIGA JOULES
TOTAL ENERGY CONSUMED	12.870	GIGA JOULES

SUBSYSTEM SUMMARY:

	DCT WATER	HEATING	COOLING	SYSTEM TOTAL
LOAD	N.A.	5.874	N.A.	5.874 GIGA JOULES
SOLAR FRACTION	N.A.	49	N.A.	49 PERCENT
SOLAR ENERGY USED	N.A.	2.874	N.A.	2.874 GIGA JOULES
OPERATING ENERGY	N.A.	0.677	N.A.	1.104 GIGA JOULES
AUX. THERMAL ENG	N.A.	3.001	N.A.	3.001 GIGA JOULES
AUX. ELECTRIC FUEL	N.A.	0.000	N.A.	0.000 GIGA JOULES
AUX. FOSSIL FUEL	N.A.	7.028	N.A.	7.028 GIGA JOULES
ELECTRICAL SAVINGS	N.A.	-0.325	N.A.	-0.751 GIGA JOULES
FOSSIL SAVINGS	N.A.	4.790	N.A.	4.790 GIGA JOULES

SYSTEM PERFORMANCE FACTOR: 0.549

* DENOTES UNAVAILABLE DATA
@ DENOTES NULL DATA
N.A. DENOTES NOT APPLICABLE DATA

REFERENCE: USER'S GUIDE TO THE MONTHLY PERFORMANCE REPORT OF THE NATIONAL SOLAR DATA PROGRAM,FEBRUARY 28,1978, SOLAR/0004-78/18

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
ENERGY COLLECTION AND STORAGE SUBSYSTEM (ECSS)

SITE: MCSELEY
REPORT PERIOD: MARCH,1979

SOLAR/2011-79/03

DAY OF MONTH	INCIDENT SOLAR ENERGY MILLION BTU	AMBIENT TEMP DEG-F	ENERGY TO LOADS MILLION BTU	AUX THERMAL TO ECSS MILLION BTU	ECSS OPERATING ENERGY MILLION BTU	ECSS ENERGY REJECTED MILLION BTU	ECSS SOLAR CONVERSION EFFICIENCY
1	0.150	42	0.264	0.275	0.001	N	0.568
2	0.816	49	0.220	0.208	0.018	O	0.075
3	0.329	47	0.202	0.042	0.007	T	0.258
4	0.051	47	0.101	0.181	0.000		0.785
5	0.056	59	0.141	0.187	0.000	A	0.805
6	0.234	51	0.179	0.236	0.005	P	0.187
7	0.735	45	0.270	0.146	0.017	P	0.098
8	0.071	40	0.170	0.261	0.000	L	0.779
9	0.745	48	0.254	0.118	0.016	I	0.101
10	0.365	52	0.085	0.000	0.011	C	0.096
11	0.742	35	0.237	0.155	0.016	A	0.132
12	0.922	42	0.289	0.279	0.019	B	0.124
13	0.769	49	0.221	0.081	0.019	L	0.138
14	*	*	*	*	*	E	*
15	1.023	36	0.280	0.201	0.020		0.136
16	0.909	38	0.338	0.165	0.019		0.192
17	0.871	47	0.199	0.140	0.019		0.128
18	0.659	51	0.166	0.000	0.019		0.159
19	0.614	53	0.160	0.061	0.016		0.175
20	0.865	55	0.049	0.000	0.019		0.040
21	0.865	52	0.134	0.000	0.019		0.121
22	0.794	54	0.143	0.000	0.019		0.148
23	0.348	54	0.141	0.000	0.010		0.347
24	0.088	51	0.076	0.000	0.001		0.738
25	0.377	44	0.189	0.250	0.009		0.371
26	0.885	40	0.246	0.229	0.018		0.171
27	0.342	41	0.261	0.248	0.006		0.458
28	0.706	45	0.211	0.152	0.017		0.144
29	0.647	63	0.118	0.000	0.015		0.094
30	0.691	67	0.046	0.000	0.018		0.042
31	0.695	70	0.000	0.000	0.017		0.000
SUM	17.944	-	5.568	3.736	0.404	N.A.	-
AVG	0.579	49	0.180	0.121	0.013	N.A.	0.152
NBS ID	Q001	N113			Q102		N111

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
COLLECTOR ARRAY PERFORMANCE

SITE: MOSELEY
REPORT PERIOD: MARCH,1979

SOLAR/2011-79/03

DAY OF MONTH	INCIDENT SOLAR ENERGY MILLION BTU	OPERATIONAL INCIDENT ENERGY MILLION BTU	COLLECTED SOLAR ENERGY MILLION BTU	DAYTIME AMBIENT TEMP DEG F	COLLECTOR ARRAY EFFICIENCY
1	0.150	0.031	-0.001	48	-0.004
2	0.816	0.768	0.274	60	0.336
3	0.329	0.204	0.043	50	0.129
4	0.051	0.000	0.000	45	0.000
5	0.056	0.000	0.000	58	0.000
6	0.234	0.122	0.018	50	0.078
7	0.735	0.669	0.218	53	0.297
8	0.071	0.000	0.000	41	0.000
9	0.745	0.653	0.239	55	0.320
10	0.365	0.274	0.049	61	0.134
11	0.742	0.625	0.115	37	0.155
12	0.922	0.860	0.266	49	0.289
13	0.769	0.709	0.202	57	0.263
14	*	*	*	*	*
15	1.023	0.932	0.246	36	0.240
16	0.909	0.842	0.256	44	0.282
17	0.871	0.813	0.281	62	0.323
18	0.659	0.610	0.155	62	0.234
19	0.614	0.568	0.190	61	0.309
20	0.865	0.812	0.260	63	0.301
21	0.865	0.793	0.251	63	0.290
22	0.794	0.726	0.229	65	0.289
23	0.348	0.255	0.042	61	0.122
24	0.088	0.046	0.009	*	0.108
25	0.377	0.241	0.025	49	0.065
26	0.885	0.813	0.218	43	0.246
27	0.342	0.166	0.022	48	0.064
28	0.706	0.597	0.168	51	0.237
29	0.647	0.566	0.201	70	0.310
30	0.691	0.636	0.211	75	0.306
31	0.695	0.647	0.180	78	0.259
SUM	17.944	15.476	4.513	-	-
AVG	0.579	0.499	0.146	55	0.252
NBSID	G001		G100		N100

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
STORAGE PERFORMANCE

SITE: MOSELEY
REPORT PERIOD: MARCH, 1979

SOLAR/2011-79/03

DAY OF MONTH	ENERGY TO STORAGE MILLION BTU	ENERGY FROM STORAGE MILLION BTU	CHANGE IN STORED ENERGY MILLION BTU	STORAGE AVERAGE TEMP DEG F	STORAGE EFFICIENCY
1	0.273	0.264	-0.037	111	0.832
2	0.462	0.220	0.201	117	0.911
3	0.078	0.202	-0.189	115	0.166
4	0.181	0.101	-0.009	109	0.510
5	0.187	0.141	-0.020	108	0.642
6	0.249	0.179	0.044	109	0.895
7	0.344	0.270	0.014	113	0.825
8	0.261	0.170	0.018	109	0.722
9	0.339	0.254	0.066	115	0.944
10	0.042	0.085	-0.109	114	-0.572
11	0.257	0.237	-0.030	112	0.805
12	0.538	0.289	0.159	116	0.835
13	0.272	0.221	0.012	117	0.856
14	*	*	*	*	*
15	0.432	0.280	-0.000	114	0.647
16	0.400	0.338	0.039	115	0.940
17	0.405	0.199	0.104	120	0.749
18	0.143	0.166	-0.093	119	0.513
19	0.242	0.160	0.037	117	0.815
20	0.243	0.049	0.145	124	0.799
21	0.236	0.134	0.015	130	0.631
22	0.216	0.143	-0.012	128	0.608
23	0.027	0.141	-0.179	123	-1.383
24	0.003	0.076	-0.157	115	-31.326
25	0.265	0.189	-0.021	112	0.630
26	0.440	0.246	0.173	116	0.953
27	0.264	0.261	-0.078	113	0.694
28	0.308	0.211	0.067	116	0.903
29	0.194	0.118	0.027	118	0.745
30	0.183	0.046	0.102	123	0.808
31	0.168	0.000	0.120	131	0.716
SUM	7.906	5.566	0.423	-	-
AVG	0.255	0.180	0.014	117	0.758
NBS ID	Q200	Q201	Q202		N108

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
SPACE HEATING SUBSYSTEM

SITE: MOSELEY
REPORT PERIOD: MARCH,1979

SOLAR/2011-79/03

DAY OF MON.	SPACE HEATING LOAD MILLION BTU	SOLAR FR.OF LOAD PCT	SOLAR ENERGY USED MILLION BTU	OPER ENERGY MILLION BTU	AUX THERMAL USED MILLION BTU	AUX ELECT FUEL MILLION BTU	AUX FOSSIL FUEL MILLION BTU	ELECT ENERGY SAVINGS MILLION BTU	FOSSIL ENERGY SAVINGS MILLION BTU	BLDG TEMP DEG. F	AMB TEMP DEG. F
1	0.264	32	0.085	0.036	0.179	0.000	0.000	-0.020	0.142	73	42
2	0.220	28	0.061	0.027	0.159	0.000	0.140	-0.014	0.101	72	49
3	0.202	42	0.085	0.022	0.117	0.000	0.091	-0.009	0.141	71	47
4	0.101	39	0.040	0.014	0.061	0.000	0.373	-0.008	0.066	66	47
5	0.141	32	0.045	0.022	0.096	0.000	0.321	-0.014	0.075	69	59
6	0.179	25	0.044	0.028	0.135	0.000	0.486	-0.017	0.073	71	51
7	0.270	27	0.072	0.033	0.198	0.000	0.256	-0.016	0.120	72	45
8	0.170	32	0.055	0.027	0.115	0.000	0.543	-0.017	0.092	71	40
9	0.254	30	0.075	0.029	0.178	0.000	0.282	-0.014	0.125	71	48
10	0.085	41	0.035	0.007	0.050	0.000	0.028	-0.002	0.058	67	52
11	0.237	42	0.098	0.025	0.138	0.000	0.271	-0.011	0.164	67	35
12	0.289	39	0.114	0.035	0.175	0.000	0.487	-0.017	0.190	70	42
13	0.221	48	0.106	0.024	0.115	0.000	0.216	-0.010	0.177	70	49
14	*	*	*	*	*	*	*	*	*	*	*
15	0.280	50	0.140	0.032	0.140	0.000	0.380	-0.015	0.233	71	36
16	0.338	52	0.175	0.036	0.163	0.000	0.368	-0.016	0.291	71	38
17	0.199	56	0.111	0.021	0.088	0.000	0.256	-0.009	0.185	68	47
18	0.166	63	0.105	0.015	0.061	0.000	0.002	-0.005	0.175	68	51
19	0.160	67	0.108	0.019	0.052	0.000	0.101	-0.009	0.179	71	53
20	0.049	71	0.035	0.004	0.015	0.000	0.038	-0.001	0.058	69	55
21	0.134	78	0.105	0.012	0.029	0.000	0.024	-0.004	0.175	71	52
22	0.143	82	0.118	0.012	0.025	0.000	0.023	-0.004	0.196	73	54
23	0.141	86	0.121	0.012	0.020	0.000	0.026	-0.003	0.201	72	54
24	0.076	86	0.065	0.007	0.011	0.000	0.027	-0.003	0.108	68	51
25	0.189	74	0.140	0.023	0.049	0.000	0.436	-0.012	0.233	68	44
26	0.246	62	0.151	0.030	0.094	0.000	0.441	-0.015	0.252	70	40
27	0.261	60	0.157	0.033	0.105	0.000	0.457	-0.017	0.261	71	41
28	0.211	48	0.102	0.024	0.109	0.000	0.291	-0.011	0.170	70	45
29	0.118	52	0.061	0.011	0.056	0.000	0.026	-0.004	0.102	71	63
30	0.046	64	0.029	0.004	0.017	0.000	0.023	-0.002	0.048	72	67
31	0.000	0	0.000	0.000	0.000	0.000	0.031	0.000	0.000	70	70
SUM	5.568	-	2.724	0.642	2.844	0.000	6.661	-0.308	4.540	-	-
AVG	0.180	49	0.088	0.021	0.092	0.000	0.215	-0.010	0.146	70	49
NBS	Q402	N400	Q400	Q403	Q401		Q410	Q415	Q417	N406	N113

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
ENVIRONMENTAL SUMMARY

SITE: MOSELEY
REPORT PERIOD: MARCH,1979

SOLAR/2011-79/03

DAY OF MONTH	TOTAL INSOLATION BTU/SQ.FT	DIFFUSE INSOLATION BTU/SQ.FT	AMBIENT TEMPERATURE DEG F	DAYTIME AMBIENT TEMP DEG F	RELATIVE HUMIDITY PERCENT	WIND DIRECTION DEGREES	WIND SPEED M.P.H.
1	376	N	42	48	N	N	N
2	2041	O	49	60	O	O	O
3	822	T	47	50	T	T	T
4	127		47	45			
5	140	A	59	58	A	A	A
6	586	P	51	50	P	P	P
7	1836	P	45	53	P	P	P
8	176	L	40	41	L	L	L
9	1863	I	48	55	I	I	I
10	913	C	52	61	C	C	C
11	1855	A	35	37	A	A	A
12	2305	B	42	49	B	B	B
13	1923	L	49	57	L	L	L
14	*	E	*	*	E	E	E
15	2557		36	36			
16	2272		38	44			
17	2177		47	62			
18	1648		51	62			
19	1536		53	61			
20	2164		55	63			
21	2163		52	63			
22	1984		54	65			
23	869		54	61			
24	220		51	*			
25	943		44	49			
26	2212		40	43			
27	854		41	48			
28	1766		45	51			
29	1619		63	70			
30	1728		67	75			
31	1738		70	78			
SUM	44860	N.A.	-	-	-	-	-
AVG	1447	N.A.	49	55	N.A.	N.A.	N.A.
NBS ID	G001		N113			N115	N114

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